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which it arose. The new gene should prove to be linked with dark-eye, like its allelomorph, albinism. Since it occupies, in a scale of dominance, an intermediate position between color and albinism, the mutant should give a coupling series when mated

to albinos carrying pink-eye $\left(F^1 = \frac{c^d}{c} \frac{P}{p}\right)$

but a repulsion series when the same mutant is mated to pink-

eyed colored individuals $\left(F_1 = \frac{c^d}{C} \frac{P}{p}\right)$.

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GENITAL ORGANS OF HERMAPHRODITIC FUR SEALS

THE resumption of commercial killing of the surplus and useless males of the fur-seal herd resorting to the Pribilof Islands of Alaska furnished an opportunity to study the life history and anatomy of this group of mammals. After a lapse of six years, killing was begun again in 1918 by the Bureau of Fisheries. Upwards of 33,000 males, mostly young, were secured and their skins preserved for sale by the government. Two hermaphroditic animals were killed among this large number and the writer had an opportunity of examining the sexual organs of both. Such abnormalities of the species have not previously been recorded and since they are rarely found among mammals of any species it seems desirable to note the occurrence with a brief description. The organs of both animals have been deposited in the United States National Museum.

Normally the female Alaska fur-seal has two kidney-shaped ovaries located just forward of the pelvis and loosely invested in the folds of connecting ligaments. Blood vessels, ureters, fallopian tubes and uteri are attached to the same folds. The ureters pass above the genitalia but bend down below to reach the tip of the bladder. The uterus is bicarinate, an ovary being attached to the distal end of each horn. It is pretty well determined that each side functions alternately every other year. The horns unite in the median line and the vagina continues to the exterior, a distance of about 20 cm. Attached to the lower side of the vagina is the pear-shaped and very muscular bladder. The urethra leading therefrom is deeply embedded in the muscular walls of the lower vagina as it passes to its point of discharge near the exterior.

The first of the hermaphroditic animals to be described was found at the Northeast Point hauling grounds of St. Paul Island on August 6, 1918. It was four years old and thought to be a male by the external characters of the head. It was not discovered to be bisexual until skinning had started and the mammary glands were found fairly well developed and containing a small amount of milk. This is one of the first characters to be noted when a female has been killed. As the native skinner thought this had happened, my attention was immediately called to the matter. Two or three dozen females are unavoidably secured when large killings are made in the manner followed in 1918 and it was thought that this was one of these unfortunate accidents. But when the penis opening on the abdomen was seen in the usual place it was known that a freak had been found and its organs and skull were preserved.

The right ovary was found to be smaller than normal and pear-shaped instead of flatly oval and it was entirely divested of the usual covering membrane. Its fallopian tube was thicker and fleshier than usual. But the left ovary was much larger than normal and the membrane was firmly attached all over its surface by adhesions. Both horns of the uterus were normal in shape but smaller than usual in a four year old female. The walls of the vagina leading backward from the uterus were extremely heavy and firm. The opening grew smaller and smaller posteriorly until it reached the point of junction of the vagina walls and the penis. Then it followed the latter organ forward on the ventral side as a small duct. The opening to the exterior was near the distal end of the penis.

There were no testes; rudiments even could not be found. But the penis was well developed and in the normal position. The os penis was only about one fourth as large as would be found in a male of equal age. The cartilaginous continuation of this bone and the continuation of the walls of the vagina were one and the same.

The urinary system was normally developed, the bladder being attached to the vagina. The urethra followed the penis forward on the side opposite from the duct of the vagina. The muscles for the retraction of the penis were well developed.

It would seem that the presence of the female reproducing organs would preponderate in affecting other characters of the animal such as the skull. (This is widely different in the two

sexes.) But such was not the case. Although possessing decided features of both sexes the skull resembles, far more, one of a male of the same age.

The other specimen found in 1918 was very much less interesting. It was secured on Lukanin field, St. Paul Island. The organs were brought to me after the killing was over in a somewhat mutilated condition but the relations seemed to be about as follows:

There was a pair of testes, apparently in the usual position of ovaries. The spermatic cords united above the neck of the bladder and seemed to discharge through a large blind glandular-walled pouch. This latter was taken to be a pathological vagina and was all that remained of the female system. The bladder was normal in size and the urethra passed straight backward from it as in the female. A rudimentary penis two centimeters long with a minute bone projected posteriorly beneath the anus and the opening of what was taken to be the vagina. The urethra discharged through this penis. This animal was probably a two year old, but its skull was not preserved and the external characters were not reported to me.

An old native sealer once told me that he had seen a half male and half female seal about five or six years old. It was as large as a male of that age but had the beautiful soft pelage of the female or the young male. In this connection it is worth while to recall an attempt which was made with poor success in 1896 to castrate pups. It might be that he saw one of these but it is more likely that he saw a hermaphrodite. It has been recommended that castration be attempted on animals older than pups, say two year olds. If successful it is probable that they would develop to the size of the full-grown male but would retain the very valuable fur of undeveloped males or of females. As the males are when full grown four to six times as large as the females, the pelts should be proportionately increased in value.

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